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(71) Applicant(s)
Silver Reader Inc
(Incorporated in Taiwan)
6F, No.116 Hsin Tai Wu Road, Sec.1, Schichin,
Taipei County, Taiwan

(72) Inventor(s)
Sheng-Yueh Yao

(74) Agent and/or Address for Service
Edward Evans & Co
Clifford's Inn, Fetter Lane, LONDON, EC4A 1BX,
United Kingdom

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(54) Abstract Title
Optical recording medium structure having a memory chip

(57) An optical recording medium structure 10 having a memory chip 20 according to the invention is provided. The optical recording medium structure 10 is arranged with a memory chip 20 and an antenna structure 22. The memory chip 20 is used to record information related to manufacturer, seller and protective key required by users. The information stored in the memory chip 20 can be transmitted to an external reader through the antenna structure 22.

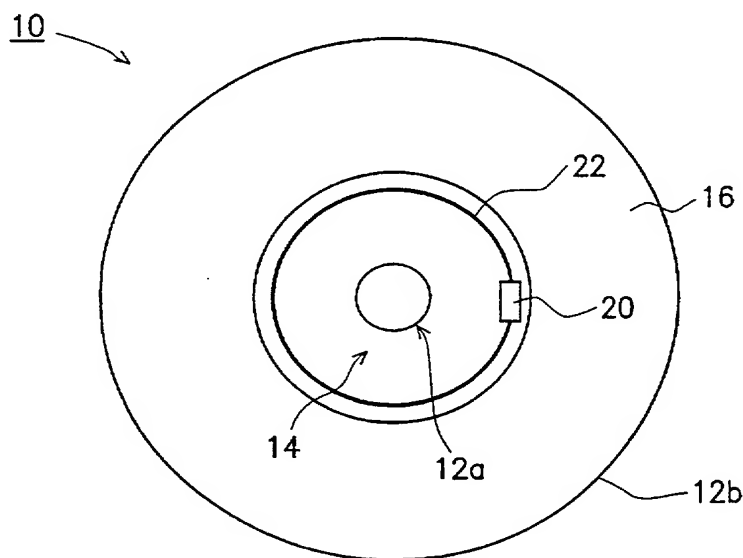


FIG. 1

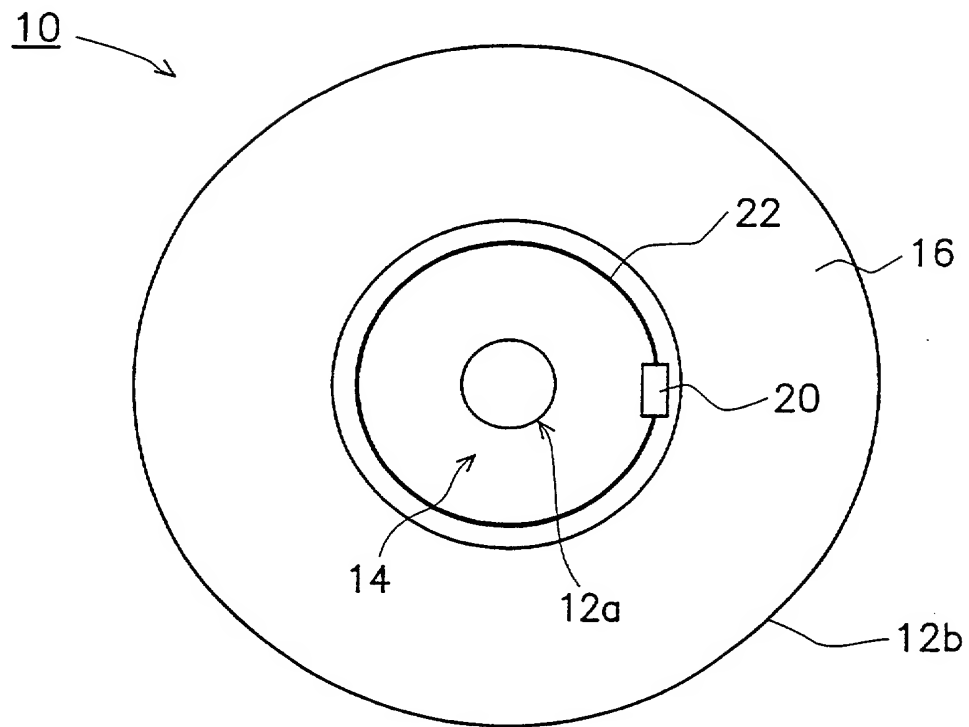


FIG. 1

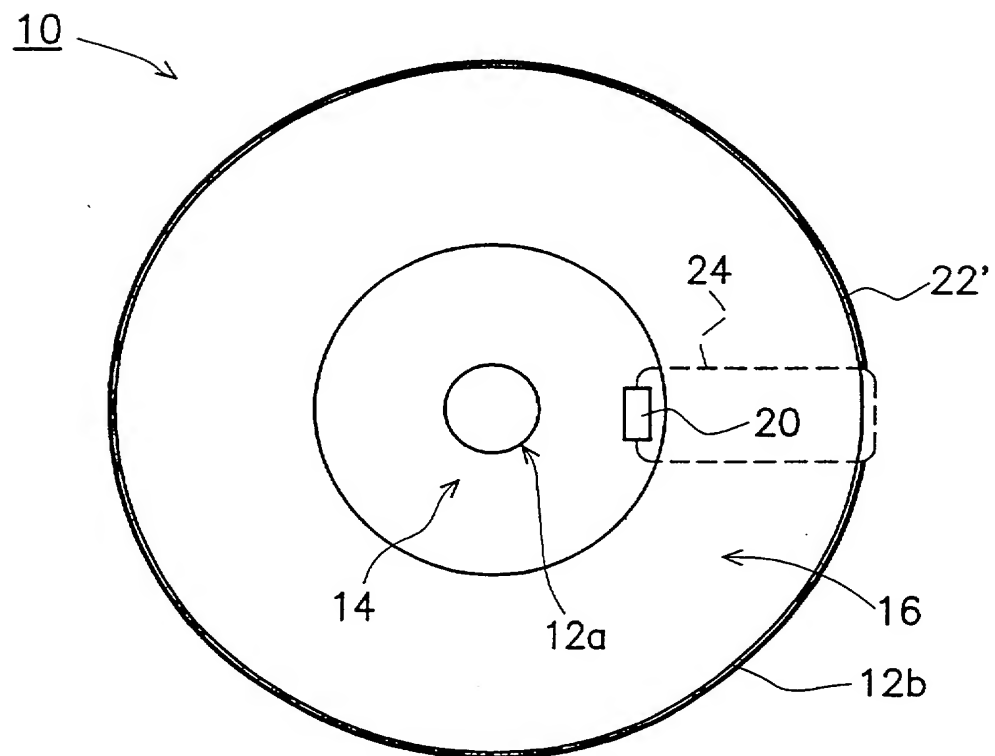


FIG. 2

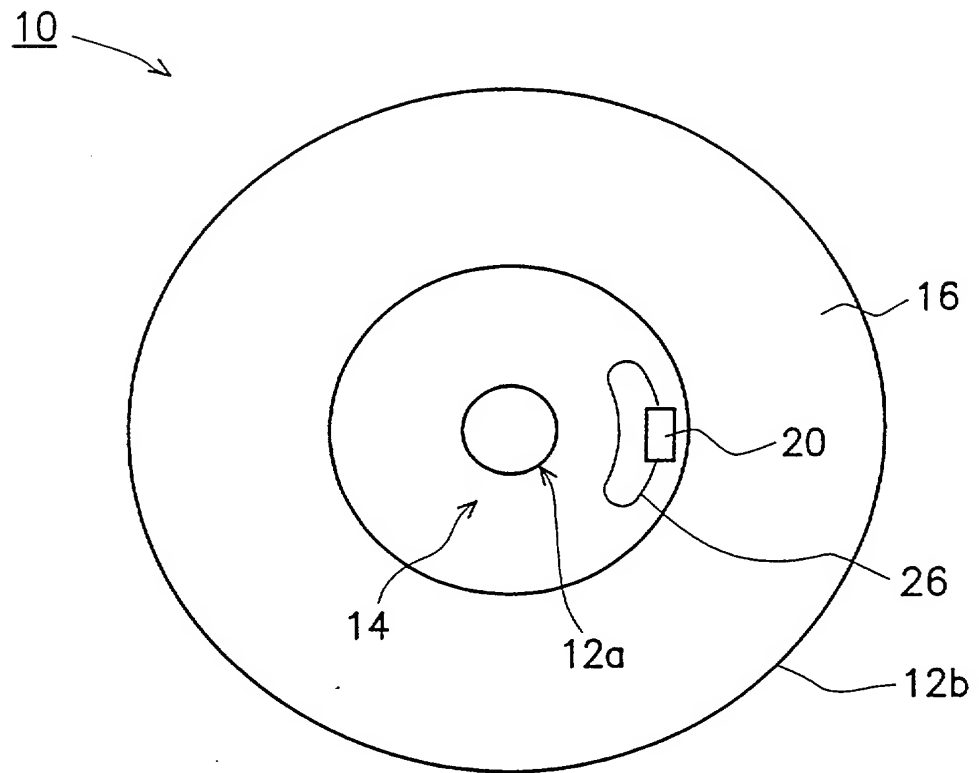


FIG. 3

OPTICAL RECORDING MEDIUM STRUCTURE HAVING A MEMORY CHIP

BACKGROUND OF THE INVENTION

1. Field of the Invention

The invention relates to an optical recording medium structure, and in particular to
5 an optical recording medium structure having a memory chip.

2. Description of the Related Art

An optical recording medium, called a compact disc, such as CD-ROM, CD, VCD, DVD, CD-R or CD-RW, is widely used in current markets. On a normal compact disc, there is an inner ring which is substantially transparent and mainly used to support the
10 read head of CD player. For easy shipping and stock and quality control, information, such as merchandise serial number and bar code, is printed on the inner ring.

However, since the merchandise serial number, bar code, etc. are directly printed on the inner ring, the compact disc cannot be identified after it is packaged. Furthermore, not much information can be printed on the inner ring.. In practice, the
15 prior method is not sufficient for the purposes of product management and piracy and theft prevention. Currently, there are a variety of methods used to protect optical recording media from being pirated. Most of them perform a specific process on the recording areas of the optical recording media, thereby protecting the optical recording media from illegal copying. However, parts of the recording areas of the optical
20 recording media are occupied by this process. Moreover, magnetic bars and magnetic

cards are commonly used as anti-theft devices in the current market. As described above, for the purposes of product management and piracy and theft prevention, it is necessary to have various methods and technologies. However, it results in very poor efficiency.

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SUMMARY OF THE INVENTION

In view of the above, the object of the invention is to provide an optical recording medium structure having a memory chip, wherein the memory chip has a small volume and a large memory capacity and can record various pieces of information according to practical requirements.

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Furthermore, the invention provides an optical recording medium structure having a memory chip, wherein the memory chip can be disposed on an inner ring of an optical recording medium. That is, the memory chip does not occupy the recording area of the optical recording medium.

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Additionally, the invention provides an optical recording medium structure having a memory chip, wherein information can be received from/transmitted to the memory chip through an antenna. Therefore, even though the optical recording medium structure is completely packaged, information stored in the memory chip can be smoothly received through the antenna.

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An optical recording medium structure having a memory chip according to the invention includes an optical recording medium, a memory chip and an antenna structure. The optical recording medium has an inner periphery, an outer periphery, a

printed surface and an inner ring, wherein the printed surface is located between the inner and outer peripheries, and the inner ring is located between the inner periphery and the printed surface. The memory chip is either adhered or mounted on the surface of the inner ring of the optical recording medium. The antenna structure is also
5 disposed on the surface of the inner ring of the optical recording medium and is electrically coupled to the memory chip. Through the antenna structure, information stored in the memory chip can be smoothly transmitted to an external reader.

Since the memory chip has a large memory capacity used to store various pieces of information, the memory chip can provide product management, anti-piracy and anti-theft functions in the inventive optical recording medium structure.
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In addition, another optical recording medium structure having a memory chip in accordance with the invention comprises an optical recording medium, a memory chip, an antenna structure and a conductive line. The optical recording medium has an inner periphery, an outer periphery, a printed surface and an inner ring. The printed surface
15 is located between the inner and outer peripheries. The inner ring is located between the inner periphery and the printed surface. The memory chip is either adhered or mounted on the surface of the inner ring of the optical recording medium. The antenna structure is adhered or mounted on the outer periphery of the optical recording medium. The conductive line is mounted on the printed surface. Furthermore, the antenna
20 structure is electrically connected to the memory chip through the conductive line. With the antenna structure, information stored in the memory chip can be transmitted to an external reader.

Similarly, since the memory chip has a large memory capacity used to store various pieces of information, the memory chip can provide product management, anti-piracy and anti-theft functions in the inventive optical recording medium structure.

BRIEF DESCRIPTION OF THE DRAWINGS

5 The invention will be more fully understood from the detailed description given hereinbelow and the accompanying drawings, which are given by way of illustration only, and thus do not limit the present invention, wherein:

Fig. 1 is a schematic view showing an optical recording medium structure having a memory chip according to a first embodiment of the invention;

10 Fig. 2 is a schematic view showing an optical recording medium structure having a memory chip according to a second embodiment of the invention; and

Fig. 3 is a schematic view showing an optical recording medium structure having a memory chip according to a third embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

15 Referring to Fig. 1, an optical recording medium structure having a memory chip is shown. The optical recording medium structure 10 includes an optical recording medium having an inner periphery 12a, an outer periphery 12b, a printed surface 16, an inner ring 14, a memory chip 20 and an antenna structure 22. The memory chip 20 is used to record information, related to manufacturer, seller, protective key, etc., required
20 by users. The information stored in the memory chip 20 can be transmitted to an

external reader (not shown) through the antenna structure 22. The above-mentioned optical recording medium can be CD-ROM, VCD or DVD.

The printed surface 16, which is located between the inner periphery 12a and the outer periphery 12b, is a region for pattern design. The inner ring 14 located between
5 the inner periphery 12a and the printed surface 16 is usually made of a transparent material and can also be designed with patterns, but is not used for data recording.

As shown in Fig. 1, the memory chip 20 is directly adhered to the inner ring 14. If the optical recording medium is a double-sided recording DVD with two layers, the memory chip 20 can be compressed between the upper and lower inner rings (not
10 shown) thereof.

A most commonly used smart card can serve as the memory chip 20. Since the smart card 20 has a large memory capacity, data stored in the smart card 20 can even include product-related data, such as product serial number, product content, and manufacturing data and place, stock management data and a special protective key.
15 The antenna structure 22 is disposed on the inner ring 14 of the optical recording medium and is electrically connected to the memory chip 20. Like the memory chip 20, the antenna structure is adhered to the inner ring 14. Or, if the optical recording medium is a double-sided recording VCD with two layers, the antenna structure 22 can be mounted between the two inner rings (not shown) thereof.

20 A reader (not shown) used only for the memory chip 20 can read information stored in the memory chip 20 in coordination with the antenna structure 22. Interaction between the reader and the antenna structure 22 is performed by contactless

electromagnetic (EM) wave transmission. A power supply required by the memory chip 20 can be sensed between the reader and the antenna structure 22. In other words, data stored in the memory chip 20 can be transmitted to the reader through the antenna structure 22 in the form of a contactless electromagnetic wave.

5 Referring to Fig. 2, an optical recording medium structure having a memory chip according to a second embodiment of the invention is shown. Elements that are the same as those in the first embodiment are labeled with the same reference numerals. The second embodiment has a structure substantially similar to that of the first embodiment. The main difference is that an antenna structure 22' is adhered or
10 mounted on the outer peripheral 12b of an optical recording medium. Since a memory chip 20 is disposed on an inner ring 14 while the antenna structure 22' is disposed on the outer periphery 12b, it is necessary to use a conductive line 24, such as a metal conductive line, to electrically connect the memory chip 20 and the antenna structure 22'. To avoid signal interference, the conductive line 24 must be mounted on a printed
15 surface 16 of the optical recording medium. As such, undesired signal interference can be efficiently prevented when reading the optical recording medium.

Likewise, data stored in the memory chip 20 can be transmitted to an external reader through the antenna structure 22'. Since the memory chip 20 has a large memory capacity used to store various data, the memory chip 20 can provide product
20 management, anti-piracy and anti-theft functions in the optical recording medium structure.

For a double-sided recording DVD with two layers, since there is no printed

surface thereon, the conductive line 24 has to be mounted between the two layers. In this case, there is no signal interference created during data transmission through the conductive line 24.

Referring to Fig. 3, an optical recording medium structure 10 having a memory chip according to a third embodiment of the invention is shown. The optical recording medium structure 10 of the third embodiment is substantially similar to that illustrated in Fig. 1. The main difference between the two embodiments shown in Fig. 1 and Fig. 3 is that an antenna structure 26 is disposed on an inner ring 14 of the optical recording medium structure 10. For example, the antenna structure 26 is adhered to the inner ring 14.

As to the practical efficacy of, for example, the management of the optical recording medium, sellers can record information, such as product serial number, delivery data, and special protective key, on the memory chip 20. A reader used only for the memory chip 20 can read data stored in the memory chip 20. Moreover, data stored in the memory chip 20 can be smoothly read by the reader in a contactless manner, and then transmitted in the form of an electromagnetic wave, even when the optical recording medium structure is completely packaged with a cover. Therefore, the management efficiency of optical recording media products can be greatly improved.

When compared to the optical recording medium described in the prior art which records on an inner ring only information such as product serial number, product content and manufacturing data and place, which information can be read only when the

optical recording medium is unpacked, the optical recording medium structure of the invention is more convenient. Additionally, information stored in the memory chip 20 can include more items relating to stock and shipping management.

5 The memory chip 20 can be a read only memory chip in which all required information is written after the optical recording medium is completely manufactured. The memory chip 20 can also be a repeatable read/write memory chip in which information can be optionally written.

10 Furthermore, the memory chip 20 can record a special protective key which is used for anti-counterfeiting. As such, even if the optical recording medium is illegally copied, the counterfeit CDs cannot be read without the special protective key. Additionally, the counterfeit CDs cannot be read, if a corresponding key is different from a default value. The memory chip 20 can also store data as to whether or not the price has been paid by customers before leaving. In the invention, an appropriate reader can be used to read the memory chip to determine whether or not the price has
15 been paid, thereby providing protection against theft.

As described above, one single memory chip of the invention can simultaneously have a variety of functions which can be achieved only by different methods and technologies in the prior art. Furthermore, the inventive optical recording medium structure displays an industrial utility.

20 In a word, a first feature of the invention is that a memory chip and an antenna are disposed on an optical recording medium. The memory chip is small in size and has a large memory capacity, such that various data can be recorded according to practical

requirements.

A second feature of the invention is that information can be received/transmitted through the antenna even through the optical recording medium structure is already packaged.

5 A third feature of the invention is that all information related to product management, piracy prevention, protective key, etc., is recorded in the memory chip without need for any other additional methods.

A fourth feature of the invention is that the memory chip is disposed on an inner ring without occupying the recording area of the optical recording medium.

10 While the invention has been described by way of example and in terms of the preferred embodiment, it is to be understood that the invention is not limited to the disclosed embodiment. To the contrary, it is intended to cover various modifications and similar arrangements as would be apparent to those skilled in the art. Therefore, the scope of the appended claims should be accorded the broadest interpretation so as to
15 encompass all such modifications and similar arrangements.

WHAT IS CLAIMED IS:

1. An optical recording medium structure having a memory chip, comprising:

an optical recording medium having an inner periphery, an outer periphery, a printed surface located between the inner and outer peripheries and an inner ring located
5 between the inner periphery and the printed surface;

a memory chip disposed on the surface of the inner ring of the optical recording medium; and

an antenna structure disposed on the surface of the inner ring of the optical recording medium and electrically coupled to the memory chip.

10 2. The optical recording medium structure having a memory chip as claimed in claim 1, wherein the memory chip is a smart card.

3. The optical recording medium structure having a memory chip as claimed in claim 1, wherein the optical recording medium is a CD-ROM.

15 4. The optical recording medium structure having a memory chip as claimed in claim 1, wherein the optical recording medium is a VCD.

5. The optical recording medium structure having a memory chip as claimed in claim 1, wherein the optical recording medium is a DVD.

6. The optical recording medium structure having a memory chip as claimed in claim 5, wherein the DVD is a single-sided recording medium.

20 7. The optical recording medium structure having a memory chip as claimed in claim 5, wherein the DVD is a double-sided recording medium.

8. The optical recording medium structure having a memory chip as claimed in claim 1, wherein the memory chip and the antenna structure are adhered to the inner ring.

9. The optical recording medium structure having a memory chip as claimed in claim 1, wherein the memory chip and the antenna structure are mounted on the inner ring.

- 5 10. An optical recording medium structure having a memory chip, comprising:
an optical recording medium having an inner periphery, an outer periphery, a printed surface located between the inner and outer peripheries and an inner ring located between the inner periphery and the printed surface;
a memory chip disposed on the surface of the inner ring of the optical recording medium; and
10 an antenna structure adhered on the outer periphery of the optical recording medium; and
a conductive line mounted on the printed surface for electrically connecting the memory chip and the antenna structure.

15 11. The optical recording medium structure having a memory chip as claimed in claim 10, wherein the memory chip is a smart card.

12. The optical recording medium structure having a memory chip as claimed in claim 10, wherein the optical recording medium is a CD-ROM.

13. The optical recording medium structure having a memory chip as claimed in claim 1, wherein the optical recording medium is a VCD.

20 14. The optical recording medium structure having a memory chip as claimed in claim 1, wherein the optical recording medium is a single-sided recording DVD.

15. The optical recording medium structure having a memory chip as claimed in claim 1, wherein the optical recording medium is a double-sided recording DVD, and the conductive line is compressed between the two layers of the double-sided recording

16. The optical recording medium structure having a memory chip as claimed in claim 10, wherein the memory chip is adhered to the inner ring.

17. The optical recording medium structure having a memory chip as claimed in claim 10, wherein the memory chip is mounted on the inner ring.

18. The optical recording medium structure having a memory chip as claimed in claim 10, wherein the antenna structure is adhered to the outer periphery.

19. The optical recording medium structure having a memory chip as claimed in claim 10, wherein the conductive line is a metal conductive line.

20. A method for protecting an optical recording medium which has a memory chip, wherein the memory chip stores a protective key, the method comprising the steps of:

detecting the protective key stored in the memory chip; and

correctly reading the optical recording medium only when the protective key is equal to a default value.

21. An optical recording medium structure substantially as hereinbefore described with reference to and/or substantially as illustrated in any one of or any combination of the accompanying drawings.

22. A method for protecting an optical recording medium substantially as hereinbefore described with reference to and/or substantially as illustrated in any one of or any combination of the accompanying drawings.



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Claims searched: 1 to 22

Examiner: Donal Grace
Date of search: 29 July 1999

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.Q): G5R (RB21, RB23, RHB, RHE)
Int Cl (Ed.6): G06K 19/08, 19/10 G11B 7/00, 7/24, 20/00, 23/28, 23/30, 23/34
Other: Online: EPODOC; JAPIO; WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	EP 0720102 A1 (NTT)	20
X	WO 97/41562 A1 (GIESECKE & DEVRIENT)	1 to 4, 8, 9, and 20
X	US 5862117 (FUENTES et al)	1 to 20
X	US 5652838 (LOVETT et al)	1 to 4, 8, 9, and 20

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